CLAIMS

WHAT IS CLAIMED IS:

1. A method for decoding image data comprising:

receiving encoded image data comprising I-picture, P-picture, and B-picture data;

performing inverse discrete cosine transform IDCT decoding on I-picture data at a first resolution;

storing the decoded I-picture data, scaling the stored I-picture data based on a display size, and outputting the scaled I-picture data for display;

performing IDCT decoding on P-picture data at the first resolution;

performing motion compensation processing on the decoded P-picture data;

storing the motion-compensated P-picture data, scaling the stored P-picture data based on the display size, and outputting the scaled P-picture data for display;

performing IDCT decoding on B-picture data at a second resolution, the second resolution being lower than the first resolution;

performing motion compensation processing on the decoded B-picture data; and

storing the motion-compensated B-picture data, scaling the stored B-picture data to the display size, and outputting the scaled B-picture data for display.

2. A method as recited in claim 1, wherein the first resolution comprises full vertical resolution and one-half horizontal resolution.

3. A method as recited in claim 2, wherein performing motion compensation processing on the decoded B-picture data includes:

retrieving stored picture data at the first resolution based on motion vector data;

determining if the motion vector data specifies a pixel position that does not have a corresponding pixel within the retrieved picture data;

up-sampling the retrieved picture data to compute the missing pixel if the motion vector data is determined to specify a pixel position that does not have a corresponding pixel within the retrieved picture data; and

down-sampling the picture data with the computed missing pixel to the second resolution.

4. A method as recited in claim 1, wherein the second resolution comprises one-half vertical resolution and one-half horizontal resolution.

5. A method as recited in claim 1, further comprising up-sampling the IDCT-decoded B-picture data to the first resolution prior to performing motion compensation.

6. A method as recited in claim 5, wherein performing motion compensation processing on the data includes:

retrieving stored picture data at the first resolution based on motion

vector data;

determining if the motion vector data specifies a pixel position that does not have a corresponding pixel within the retrieved picture data;

up-sampling the retrieved picture data to compute the missing pixel if the motion vector data is determined to specify a pixel position that does not have a corresponding pixel within the retrieved picture data ;

down-sampling the picture data with the computed missing pixel to the first resolution.

7. A system for decoding image data including I-picture, P-picture, and B-picture encoded data, comprising:

a memory;

an IDCT decoder for performing IDCT decoding on I-picture and P-picture data at a first resolution and on B-picture data at a second resolution lower than the first resolution;

a processor for storing the decoded I-picture data in the memory, performing motion compensation processing on the decoded P-picture and B-picture data, and storing the motion-compensated P-picture and B-picture data in memory; and

a video scaler which scales the stored I-picture, P-picture, and B-picture data based on a display size and outputs the scaled data for display.

8. A system as recited in claim 7, wherein the first resolution comprises full vertical resolution and half horizontal resolution of the original unencoded picture and the second resolution comprises half vertical and half horizontal resolution of the original unencoded picture.

9. A system as recited in claim 8, comprising an up-sampling element which converts the B-picture decoded data from the IDCT decoder from the first resolution to the second resolution.

10. A system for decoding image data including I-picture, P-picture, and B-picture encoded data, comprising:

a memory;

an IDCT decoder for performing IDCT decoding on I-picture data, P-picture data, and B-picture data at a first resolution lower than the resolution of the original unencoded picture;

a processor which stores the IDCT-decoded I-picture data in the memory, performs motion compensation processing on the decoded P-picture and B-picture data, and stores the motion-compensated P-picture and B-picture data in memory; and

a video scaler which scales the stored I-picture, P-picture, and B-picture data to the display size and outputs the scaled data for display.

11. A method of decoding image data comprising:

receiving an array of discrete cosine transform ("DCT") coefficients representing a block of image data of one of a plurality of types

of pictures;

performing inverse discrete cosine transform on a sub-portion of the DCT coefficients to obtain a block of pixel data equal in size to the sub-portion if the block of image data represents a first type of picture;

performing motion compensation on the block of pixel data to obtain a second block of pixel data;

scaling the second block of pixel data based on a size of a display; and

displaying the second block of pixel data on the display.

12. The method of claim 11, wherein the first type of picture includes a bi-directionally predictive-coded picture.

13. The method of claim 11, wherein the array of DCT coefficients is 8x8 in size and the sub-portion of the DCT coefficients is 4x8 in size.

14. The method of claim 11, wherein the array of DCT coefficients is 8x8 in size and the sub-portion of the DCT coefficients is 4x4 in size.

15. A method of decoding image data comprising:

receiving an array of discrete cosine transform ("DCT") coefficients representing a block of image data of one of a plurality of types of pictures;

performing inverse discrete cosine transform on a sub-portion of the DCT coefficients to obtain a first block of pixel data equal in size to the sub-portion if the block of image data represents a first type of picture;

up-sampling the first block of pixel data to obtain a second block of pixel data;

performing motion compensation on the second block of pixel data to obtain a third block of pixel data; and

displaying the third block of pixel data.

16. The method of claim 15, further comprising:

scaling the third block of pixel data based on a size of a display.

17. The method of claim 15, wherein the first type of picture is a bi-directionally predictive-coded picture.

18. The method of claim 15, wherein the array of DCT coefficients is 8x8 in size and the sub-portion of the DCT coefficients is 4x4 in size.

19. The method of claim 18, wherein the second block of pixel data is 4x8.

20. A computer readable medium containing instructions, which if executed by a computer system, causes the computer system to perform an operation comprising:

receiving encoded image data comprising I-picture, P-picture, and B-picture data;

performing inverse discrete cosine transform IDCT decoding on I-picture data at a first resolution;

storing the decoded I-picture data, scaling the stored I-picture data based on a display size, and outputting the scaled I-picture data for display;

performing IDCT decoding on P-picture data at the first resolution;

performing motion compensation processing on the decoded P-picture data;

storing the motion-compensated P-picture data, scaling the stored P-picture data based on the display size, and outputting the scaled P-picture data for display;

performing IDCT decoding on B-picture data at a second resolution, the second resolution being lower than the first resolution;

performing motion compensation processing on the decoded B-picture data; and

storing the motion-compensated B-picture data, scaling the stored B-picture data to the display size, and outputting the scaled B-picture data for display.

21. A computer readable medium containing instructions, which if executed by a computer system, causes the computer system to perform an operation for decoding image data, the operation comprising:

receiving an array of discrete cosine transform ("DCT") coefficients representing a block of image data of one of a plurality of types of pictures;

performing inverse discrete cosine transform on a sub-portion of the DCT coefficients to obtain a block of pixel data equal in size to the sub-portion if the block of image data represents a first type of picture;

performing motion compensation on the block of pixel data to obtain a second block of pixel data;

scaling the second block of pixel data based on a size of a display; and

displaying the second block of pixel data on the display.

22. A computer readable medium containing instructions, which if executed by a computer system, causes the computer system to perform an operation for decoding image data, the operation comprising:

receiving an array of discrete cosine transform ("DCT") coefficients representing a block of image data of one of a plurality of types of pictures;

performing inverse discrete cosine transform on a sub-portion of the DCT coefficients to obtain a first block of pixel data equal in size to the sub-portion if the block of image data represents a first type of picture;

up-sampling the first block of pixel data to obtain a second block of pixel data;

performing motion compensation on the second block of pixel data to obtain a third block of pixel data; and

displaying the third block of pixel data.

23. A method for a decoder comprising:

receiving encoded image data; and

selectively performing a modified inverse discrete cosine transform (IDCT) process to generate an output pixel array block at a lower resolution than the resolution of the received encoded image data.

24. The method of claim 23, wherein the output pixel array block includes a 4 x 8 pixel array block or a 4 x 4 pixel array block.

25. A computer readable medium containing instructions, which if executed by a computer system, causes the computer system to perform an operation for decoding image data, the operation comprising:

receiving encoded image data; and

selectively performing a modified inverse discrete cosine transform (IDCT) process to generate an output pixel array block at a lower resolution than the resolution of the received encoded image data.